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ABSTRACT

Covering the period between July 1 to December 31, 1976, this third semi-annual report on the Applied Fishery Science Program operative at Sheldon Jackson College in Sitka, Alaska deals primarily with the first quarter of hatchery and educational program operation. Specifically, this report addresses the following: Program Objectives; Advisory Committee; Program Staff; Planning and Coordination (funding sources, operational permits, cooperative educational programs, and student recruitment and program publicity); Academic Program and Placement Service (first year enrollment, curriculum development, and placement service); Aquaculture Facilities (gravel egg incubator, weirs, teaching wet lab, pink salmon spawning, chum salmon spawning, and coho salmon spawning); Advisory Services (information dissemination and cooperative efforts and contacts). Also included is a summary which indicates: on-schedule implementation; progress in the development of cooperative programs; continued state-wide exposure via recruiting trips, advisory services, participation in workshops/conferences media coverage, and high school counselors; intensified efforts to secure other income sources; the need for an emphasis upon on-the-job training via expanded opportunities for students to assist in the hatchery operation; continued advisory services on aquaculture development; a first year enrollment of 12 technicians and 6 transfer students. (JC)

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SHELDON JACKSON COLLEGE FISHERIES PROGRAM

RC009910

DEVELOPMENT OF AN APPLIED FISHERIES SCIENCE PROGRAM FOR NATIVE ALASKANS AT SHELDON JACKSON COLLEGE

THIRD PROGRESS REPORT

1 January 1976

Submitted by

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Not for publication

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TABLE OF CONTENTS

	Page
Report Summary	i
Introduction	1
Background	1
Program Objectives	3
Advisory Committee	3
Program Staff	3
Program Progress	4
Planning and Coordination	4
Operational Permits	4
Cooperative Educational Programs	6
Student Recruitment and Program Publicity	7
Funding Sources	10
Academic Program and Placement Service	11
Curriculum Development	12
First Year Enrollment	14
Placement Service	15
Aquaculture Facilities	15
Gravel Egg Incubator	16
Weirs	17
Teaching Wet Lab	18
Pink Salmon Spawning	19
Chum Salmon Spawning	21
Coho Salmon Spawning	21
Advisory Services	22
Information Dissemination	22
Cooperative Efforts and Contacts	22
Acknowledgments	25
Appendices	
A. Financial Report	27
B. Revised Membership, Technical Advisory Committee	28
C. Chairman's Report	29

REPORT SUMMARY

1. Program objectives as outlined in the planning schedule approved by the Technical Advisory Committee are developing on schedule.
2. No objections were raised at the public hearing for the SJC salmon hatchery and all operational permits were obtained in time for fall spawning.
3. Development of cooperative programs with other educational institutions is proceeding actively.
4. The SJC Fisheries Program continues to gain state-wide exposure through recruiting trips, advisory services, participation in workshops and conferences, media coverage, and high school counselors.
5. Efforts are being intensified to secure other sources of income during build up of sufficient spawner returns to harvest for program support.
6. A multiple credential academic program was developed and initiated this fall. Initial observations indicate emphasis should be directed toward on-the-job training by expanding opportunities for students to assist in the hatchery operation.
7. First year enrollment consisted of 12 technicians and 6 transfer students. Three technician students withdrew during fall semester and four new enrollees are beginning at spring semester.
8. Job placement service is being solidified by systematic contact with public agencies and private corporations.
9. Campus hatchery facilities were constructed as planned and have functioned to date with no major problems.

10. The incubators currently contain the following numbers of eggs or sac fry: 1.8 million pink salmon, 75,000 chum salmon, 12,000 coho salmon. All of these species have attained a survival of 95% or greater to date.

11. Advisory services on Aquaculture development have continued with Native groups and begun with several new private hatchery applicants.

INTRODUCTION

The Northwest Area Foundation in 1974 provided Sheldon Jackson College with a two-year grant to establish an Applied Fishery Science Program designed for the needs of Alaska Native groups participating in salmon ranching. The first progress report documented the efforts to define program directions and to establish liaison with agencies and Native groups. The second report dealt with program implementation, including: advisory services, development of hatchery and teaching facilities, securing necessary hatchery operational permits, designing a multiple credential fisheries curriculum, and student recruitment. This, the third semi-annual report covers the period July 1 through December 31, 1975 and deals with primarily the first quarter of hatchery and educational program operation.

BACKGROUND

Private non-profit salmon hatcheries became a reality in Alaska in 1975. One year after the 1974 law authorizing the existance of private hatcheries was passed, The Alaska Department of Fish and Game (ADF&G) issued the first three permits to NERKA, Inc. of Fairbanks, Prince William Sound Aquaculture Corporation of Cordova, and Sheldon Jackson College (SJC) in Sitka. At this date, SJC is the only private hatchery incubating eggs and fry for release in the spring of 1976.

The 1974 law was enacted as an incentive to private individuals and corporations to contribute to the rehabilitation of the state's depleted fisheries. Under the law, prospective hatchery operations must be approved by ADF&G. The central feature

of this legislation is the relegation of salmon culture to the non-profit domain. Benefits will be shared by all Alaskans in the form of a rehabilitation of the salmon fisheries which can then provide physical nourishment for the people, economic sustenance for the communities, and a continuation of a way of life for those who have traditionally harvested from the common property fishery.

Among those benefiting from this new industry are Native groups with their traditional interests in renewable resources. The Native Land Claims Settlement Act provided them with necessary land and capital for salmon enhancement programs. Hatcheries are allowed a portion of the harvest above hatchery and stream stocking requirements to pay for the maintenance and expansion of their program.

Fifteen to twenty individuals and corporations are presently in various stages of permit application procedure, including the Tlingit and Haida proposed facility at Sandy Bay, 40 miles south of Sitka. The Prince William Sound Aquaculture Corporation, a regional corporation composed of fisherman, fish processors, scientists, the city councils of Cordova and Valdez, and the three Native villages of Eyak, Chenega and Tatitlek, is an example of the wide base of interest in salmon fishery rehabilitation.

Because of the need for trained salmon culture personnel who are not readily available in Alaska and the career opportunities that would arise for Alaska Natives, SJC initiated the first applied aquaculture program in Alaska. The SJC program was conceived at the suggestion of Dr. William McNeil, Chief of the Anadromous Fishes Investigations of the National Marine Fisheries Service (NMFS) at Auke Bay, Alaska. During the first year, Mr. Derek Poon directed the program and was instrumental in defining goals, establishing contacts with agencies and Native groups and procuring hatchery permits.

Program Objectives

The program was formulated with the following four goals:

1. To promote Native Alaskan education by providing an educational career ladder for Indians, Aleuts, and Eskimos so that what they learn can be applied to a practical and meaningful vocation.

2. To enhance salmon stocks by establishing a private hatchery on campus to produce fish for the common property fisheries and as a source of self-sustaining funds for the program.

3. To promote cooperation among public and private organizations involved in the development of salmon ranching.

4. To provide technical assistance and advice to Native and non-Native corporations and individuals by sharing our own experiences and the knowledge gained from others.

Advisory Committee

To help guide the program directions, a Technical Advisory Committee was formed (see Appendix B for revised membership). This committee met in November 1974 and approved a program planning schedule. They met again in November 1975 to evaluate progress and offer suggestions for modifications (see Appendix C for Chairman's report). The next meeting will be held the first week in May, 1976, after the first fry release.

Program Staff

Three full time staff members are responsible for carrying out the program objectives. Mel Seifert, Director, is in charge of all operations; Dennis Lund, instructor-Coordinator is responsible for developing and teaching the academic curriculum and was in charge of construction of the initial hatchery facility; David Bright, Aquaculture Supervisor, is in charge of the operation and maintenance of the hatchery, weir sites, and student work crews.

Program Progress

This report covers the third six month period of the Aquaculture Program and deals with hatchery and educational operations. Program objectives outlined in the timetable of the second progress report are developing on schedule. For continuity with the two previous reports present activities will be presented under the four primary tasks defined in the original planning schedule.

1. Planning and Coordination
2. Academic Program and Placement Service
3. Aquaculture Facilities
4. Advisory Services

Planning and Coordination

Four areas of activities will be described under this section:

1. Operational Permits
2. Cooperative Educational Programs
3. Student Recruitment and Program Publicity
4. Funding Sources

Operational Permits

The following table outlines the permits required for the SJC hatchery operation. All were received in time for fall spawning activities.

PERMIT	AGENCY	ISSUED
Operation of private salmon hatchery and 2 seasonal weirs.	Alaska Dept. of Fish and Game. (ADF&G)	Public hearing held July 24, 1975 in Sitka, Ak. Permit issued on Sept. 22, 1975.
Operation of seasonal weirs at Indian River (hatchery stream).	U.S. Park Service	Permit issued May 30, 1975
Operation of seasonal weir at Katlian River, South Fork, (donor stream).	U.S. Forest Service	Permit issued July 30, 1975.
Permission from land owner to secure one end of Katlian weir to his private land.	Mr. Gordon Barrett Rockerby, California	Permission granted by letter, July 9, 1975.
Approval of plans for hatchery effluent treatment and salmon carcass disposal.	Alaska Dept. of Environmental Conservation(DEC).	Approved July 2, 1975
Collection of fish and invertebrate specimens for educational purposes.	Alaska Dept. of Fish and Game	Permit issued August 15, 1975

Public Hearing

Section 16.10.410 of the Alaska Private Non-profit Hatchery Act requires that a public hearing be conducted by ADF&G in the vicinity of the proposed hatchery. The hearing for the SJC hatchery was held July 24, 1975 at Sitka. Derek Poon made our presentation which was followed by a question and answer period. No objections were raised to the proposed plans. Letters of support were received from Mr. Lee Allen, Chairman of the Matanuska Valley Fish and Game Advisory Committee, Mr. John Bosshard III, Director of Alaska Salmon Farms, Inc., Mr. Mark Jacobs, Jr., Director, SEALASKA Corp., Mr. Mark Hutton, Aquaculture Specialist, University of Alaska Marine Advisory Program.

All of the above permits and approvals are renewable on an annual basis subject to approval of issuing agencies. In addition the ADF&G hatchery permit requires a pathological examination of salmon fry prior to release and an annual report of all hatchery operations. A subsequent permit from ADF&G will specify locations and

manner in which adult stock may be harvested.

Cooperative Educational Programs

Our curriculum is primarily centered around the two-year technician program but contact is maintained with universities in the Pacific Northwest so that course offerings will be coordinated for the benefit of our transfer students. Universities with strong fisheries programs in Washington, Oregon, California, and Idaho were made aware of our program through written and personal contact. A special effort is being made to coordinate programs with the University of Alaska as they are developing a baccalaureate and graduate program at Juneau which may be well suited to the needs of our transfer students.

At the request of the SJC Fisheries Program, two courses were developed by the Sitka Community College branch of the University of Alaska on basic construction skills and equipment maintenance primarily to instruct our fisheries students, although enrollment is open.

The Fisheries Program personnel hosted an October marine science workshop on the SJC campus for Southeast Alaska high school teachers. The two day workshop included field trips, exchange of ideas and teaching methods, information on government funds available for marine education programs and the operation of the marine education program in Oregon. The workshop was sponsored by the U. of A. Marine Advisory Program and organized by Dr. Richard Lee.

A cooperative National Science Foundation aquaculture grant submitted by the University of Alaska to be administered by SJC, will provide about $3200 for equipment and operational expenses to allow an SJC student to sample nutrient levels

in deep seawater. Tats would take place in front of a shallow tidal basin near Sitka and would provide data to determine the potential of the basin as a seawater salmon rearing pond.

During the summer, Dr. Pat Wennekens, Supervisor of the ADF&G Coastal Habitat Protection Program, instructed a course in pollution biology using SJC facilities

Student Recruitment and Program Publicity

The SJC fisheries program continues to gain state-wide exposure through the following methods:

1. Recruiting Trips
2. Advisory Services
3. Participation in Workshops and Conferences
4. Media Coverage
5. High School Counselors

Recruiting Trips

Personal visits to high schools are being scheduled for January through spring term. A color slide presentation has been prepared showing this years students spawning pink salmon, other fisheries class activities and also other SJ programs such as forestry. An attempt will be made to visit all communities in Southeast Alaska. Some northern Alaska communities may be reached if funds permit. A visit to the Cordova High School has been scheduled to take place during the Salmon Aquaculture Workshop being held there in January. This community is highly motivated toward salmon hatchery development. Two new Native students from Cordova have signed up

for the SJC program next year. In addition to our own visits, the SJC Admissions Department conducts college-wide recruiting trips which include literature and slides on the Fisheries Program.

In future years it is hoped we can find funding for a technician student to accompany the director on recruiting visits. It would be more relevent to Natives to hear the story from one of their peers and could be good experience for one or more of our students.

Advisory Services

The Fisheries staff receives frequent requests for information related to private hatchery operations and salmon culture. As part of our reply to private corporations and individuals, we emphasize the need for trained personnel as an important consideration in their hatchery development plans. We also stress that our most valuable advisory service is the training of hatchery technicians.

Proposed hatchery corporations are some of our best contacts with potential students who live in the hatchery site area and can see the obvious relevancy of aquaculture training to their future. The SJC Fisheries staff maintains close contact with private, as well as government agencies to encourage their sponsorship of future SJC students and eventual employees.

Participation in Workshops and Conferences

Program presentations were given at the following events:

August:
Exhibit at Tanana Valley Chiefs Conference Fair - Fairbanks
Exhibit at Alaska State Fair - Haines
Verbal presentation to U.S. House Subcommittee of the Department of Health, Education and Welfare at SJC

September:
Entire SJC student body at weekly Forum - SJC
Sitka Woman's Club - SJC

October:
Marine Science Southeast Alaska High School Teacher's Workshop
Upward Bound students of Juneau-Douglas High School and Mt. Edgecumbe School - SJC
Rotary Club - Sitka
Alaska Federation of Natives Delegation - SJC
Representative of Alaska Special Fisheries Committee traveling the state to collect information for fisheries legislation.

November:
Alaska Native Brotherhood Annual Convention - Haines

January 1976
Staff will be attending conference on Salmon Aquaculture and the Alaskan Fishing Community - Cordova

February 1976
Attending and displaying program exhibit at Pacific Northwest Pink and Chum Salmon Workshop - Juneau.

Media Coverage

The news media continues to provide outlets for program advertisement. News releases occur on local radio and television on program activities. Articles have appeared in the SJC Today, quarterly college newspaper; Sitka Sentinel, daily local newspaper; Alaska Seas and Coasts, University of Alaska Sea Grant newsletter; Fishermen's News, a Seattle fishing newspaper; The Alaskan Fisherman, publication of the United Fishermen of Alaska; Alaska Airlines Newsletter; Alaska Conservation Society, December issue and Alaska Magazine.

Presumably most Alaska newspapers received the ADF&G news release on the issuance of the first private hatchery permits which included the educational function of the SJC program. We received and responded to a request from Fish Farming International, a quarterly magazine based in London, England, for program information to be published in their March or June issue next year. The director was interviewed by a photographer-writer for National Geographic Magazine about

the SJC salmon culture program. National Geographic is doing a book on Alaska. SJC is listed in the latest edition of the book series on career opportunities entitled "Career Opportunities for Agricultural, Forestry, and Oceanographic Technicians." Many visitors pass by the hatchery area during the tourist months of June through September. Information will be prepared for the tour bus drivers who stop near the science building to point out the facilities and explain some of the observable activities. Additionally, diagrammatic explanations will be placed on the fence in front of the adult salmon trapping area for pedestrians. A special news release will be published when Alaska's first private hatchery salmon fry head for the ocean this spring.

High School Counselors

There are a number of small villages throughout Alaska. Because of travel costs it is financially impossible to make personal recruitment visits to many of them. We shall, therefore, continue to rely on the counselors at those local schools to keep their students aware of our program. This requires keeping the counselors and community leaders aware of our progress and new developments, especially in the area of employment opportunities by annually revising and updating our program brochures.

Funding Sources

Now that the program is underway and off to a good start, one of the primary functions of the new director will be to secure other sources of income to ease the transition between the end of Northwest Area Foundation funding and harvest of sufficient surplus spawner returns to support the program by means of salmon sales. One of the main initial objectives of the program was to demonstrate the potential financial returns from salmon ranching. Money thus obtained would permit the program to become self-sustaining after Foundation support ends. However, some projections

for proposed private hatcheries in Alaska indicate about 4-6 years for a sufficient build-up of pink salmon returns to support and expand hatchery operations. Other species require longer periods of time. How fast the financial breakeven point occurs depends in large part on several factors: 1) availability of initial brood stocks; 2) level of initial egg take; 3)egg and fry capacity of hatchery; 4)number of years needed to attain hatchery egg capacity; 5) source of initial brood stock; and 6) no major losses of any year class prior to spring release.

The status of the SJC hatchery regarding the above points will be discussed in more detail under the Aquaculture Facilities section. Our present 2 million egg hatchery is simply a demonstration hatchery. Egg take will need to be increased to 6-10 million to insure sufficient funds from estimated returns to support the program. If expanded facilities can be build by this fall we will request from ADF&G an increase in pink egg take and hope a better chum run allows us more eggs from that species. In the meantime, immediate sources of funding are: 1)SJC fund drive; 2)continuation of support from the National Science Foundation (NSF); 3) student tuition. Current financial status is reported in Appendix A. Potential sources listed in the last progress report from various government agencies have not as yet revealed any concrete support, but efforts will continue along this vein, especially in the area of research grants.

Academic Program and Placement Service

A multiple credential academic program for Alaska Natives was developed and initiated this fall. Dennis Lund, our instructor-coordinator put forth a great deal of effort collecting and organizing information on technical aquaculture education during this first semester of courses. David Bright, our hatchery supervisor assisted in some of the hatchery exercises and will play an increasing role in this capacity.

Both have demonstrated the ability to achieve rapport with all the students which is crucial to effective counseling and learning motivation.

Curriculum Development

The curriculum and course description presently being used can be found in our last progress report (July 1975). Mr. Lund has developed a program which can offer a degree or certificate for both one and two years of training. Although it may be early and subjective for the fisheries staff to judge at this time, Mr. Lund's experience in the first semester has confirmed several key factors involved in the education of Alaska Natives in our Fisheries Program:

1. Some of the Native and also some non-Native students are entering the program with extremely low ability in reading, math, English and science. This requires adding basic high school level courses in these subjects to their schedules and precludes the possibility of an Associate of Science degree in two years.
2. Because of the above deficiencies, some students didn't respond well to conventional lecture - formal lab type of instruction.
3. On-the-job training in the form of hatchery duties or personal fish culture projects was preferable to conventional lab exercises because students could see immediate relevance of their training.
4. Entry levels in the aquaculture career ladder are Tech I and II or Fish Culturist I and II. Qualifications for these levels are high school education plus any work experience. Therefore, an individual with practical experience in basic hatchery techniques has an additional edge in obtaining a job.

The above factors indicate the possible future direction of training activities as follows:

1. Encourage students to take reading improvement and basic English, math and science.
2. Emphasize on-the-job training by expanding opportunities for students to assist in hatchery operation and individual fish rearing projects.
3. Attempt to place less advanced students in jobs after one year and encourage second year schooling only for those who can benefit from more conventional lecture-lab instruction required for sophomore courses and who have gained adequate background in reading, studying and basic science.
4. Consider reducing and combining the number of fisheries and aquaculture second year courses from the proposed five because most sophomores will be either technicians with little practical need for advanced fisheries concepts or transfer students who would be better advised to concentrate on more basic college courses prepatory to a four year institution.

During the semester, Mr. Lund made another NSF funded trip to Oregon to maintain contact with and gather information from fisheries science educators and fish culturists in the Pacific Northwest.

This past fall we asked students to arrive early and to be on hand for pink salmon spawning prior to school registration. We are presently planning to extend this time period earlier into August and include some high school juniors and seniors as part of an expanded orientation program. The extent of such a program will depend on future funding.

First Year Enrollment

The Fisheries Program this first year began with 12 technicians and 6 transfer students. Enrollment in the fall technician class began at 15. The students represented a broad cultural mixture: three Eskimos, two Tlingit, one Tshimshian, one Micronesian, two female and five male non-Natives. One non-Native withdrew before school started, one female temporarily withdrew until spring semester for maternal reasons, and one Native student withdrew for academic and personal reasons. He had entered college knowing he would have to finish a high school diploma at the same time but lack of sufficient motivation soon got him behind and discouraged. We have encouraged him to finish his high school diploma requirements and consider college again later when he has a firmer concept of his personal career interests. It is our policy to make sure that any student withdrawing from school does not consider it a failure based on personal inadequacy, but rather what college should be considered - another method of determining career interests and a tool to help obtain them. This fall, we have received 15 preliminary inquiries about beginning the program next fall. Three more Natives and one non-Native are entering the program at spring semester.

The Technical Advisory Committee at its last meeting in November recommended the hatchery technician program be kept at the present level of about 15 students to avoid prematurely exerting too much pressure on the staff and limited facilities and to insure a quality educational experience for our students by providing more individual attention. We are aware, however, that increased hatchery development in Alaska and demand for trained personnel necessitates that we begin immediately

to develop long-range plans for an expanded training program. Because on-the-job type training appears to be the most suitable for the needs of our students, expansion of the educational program will be closely tied to the rate of our financial ability to enlarge the hatchery and teaching laboratory facilities.

Placement Service

Locating part-time and permanent job opportunities for our students with government agencies and private hatcheries is an important objective of our program.

Two of our current students have an opportunity to work for the U.S. Fish and Wildlife Service (USFWS) this summer. Two more could work for the SJC program depending on available funding and student interest in remaining in Sitka during summer. A letter of inquiry is being sent to Alaska resource agencies requesting information on summer and permanent job opportunities for our students. Maintaining contact with public agencies and private corporations serves several purposes: 1) keeps our students informed of job opportunities related to their training; 2) keeps the various agencies aware of our program and potential employees; 3) keeps the Fisheries staff aware of agency needs in terms of the type of training and level of competency required.

Aquaculture Facilities

This section includes the following:

1. Gravel egg incubator
2. Weirs
3. Teaching wet lab
4. Pink salmon spawning
5. Chum salmon spawning
6. Coho salmon spawning

Gravel Egg Incubator

The water delivery system was completed as planned, bringing Indian River water via a buried 6-inch PVC pipe from the College hydroelectric flume across campus to the Sage Science Building area. Water was piped into the basement teaching wet lab and to the outdoor incubators consisting of twenty-four Netarts model gravel units arranged in six rows of four units each.

In addition to the plywood covers placed over each unit, styrofoam sheets were floated on the water surface of each compartment as an insulation to safeguard against extreme freezing conditions. The units have been further insulated between rows with wood chips and bark donated by Alaska Lumber and Pulp Co. of Sitka. Air temperatures have been moderate to date and therfore no circumstances have occured to test these precautions.

Each compartment was stocked with 40,000 chum eggs or 72,000 pink salmon eggs. We were allowed to take about 1.8 million pink salmon eggs, nearly twice the number originally requested. However, as the chum run was very poor and we only obtained about 75,000 eggs we split the pinks into empty units reducing alevin density to 35,000 or less in all units occupied. Egg taking activities will be reported further in a later section.

At this date nearly all the pink salmon eggs have hatched and the alevins are reposing on the gravel substrate. We sustained only 4% loss to date of eggs. We thus have over 95% survival to time of hatching for the pink salmon eggs. Chum and coho eggs were taken later in the season when the water was colder and therefore are not as far along in development, but mortality appears very low for them also.

Only two minor problems have occured with this incubation system and they are more in the category of nuisance than serious problems. 1) a filamentous

growth among the egg trays occurred during the early period of incubation. It was not attached to the eggs and was easily dislodged. We believe it to be a colonial form of iron bacteria similar to that reported at the Auke Bay lab. 2) During periods of fluctuating river flows from rainfall and one temporary drawdown of the SJC flume, a considerable amount of silt settled out in the first compartment of each incubator row and covered the eggs. Neither caused any mortalities as apparently sufficient water flow passed the bottom of the eggs exposed through the plastic mesh to provide oxygen until the eyed stage. At that point the eggs could be handled and the compartments were cleaned to insure a good environment for the sac fry. New filamentous growth did not return to the former extent, probably because colder water temperatures by then retarded its rate of growth. Such conditions might be more serious and would have to be considered for anyone who wanted to use deep gravel incubators.

Weirs

Weirs were constructed on both Katlian River, South Fork and Indian River. Circumstances of this years salmon runs were such that neither played a decisive role in our egg taking operations. Enough pink salmon showed up at the science building tailrace that we did not have to collect any pink males from the Indian River weir nor females from Katlian River as originally planned. Chums were virtually non-existent in Indian River and below ADF&G minimum escapement requirements in Katlian. Both weirs functioned well and we gained valuable experience for next year when their use may be more crucial to our operation.

The design for the Katlian weir was changed from wire mesh to picket slats to satisfy objections from ADF&G Sport Fish Division about potentially killing dolly varden, otherise it remained as described in the last progress report. Another concern was that the weir might discourage upstream migration of pink salmon or at least disturb their spawning activity in that vicinity. Neither of these situations developed as the pinks proved aggressive in their desire to move upstream and ignored people working and went about their nest digging and spawning.

The Katlian weir washed out one night apparently due to a sudden release of dammed up water upstream while the attendant was sleeping. Backed up water pouring up over the weir undercut the downstream leg of the supporting tripods. We believe this weir design is still sufficient for our purposes and that washouts can be prevented in the future by 1) protecting the bases of the support rods from water erosion and 2) keep a better watch on rising water conditions and remove panel sections before they clog with debris.

Wet Lab

A basement room in the science building has been converted to an indoor hatchery area. Trenches were cut in the concrete floor to provide drain troughs for incubator and fish tank water. Two stacks of eight tray plastic Heath incubators are being used for pink, chum, and coho incubation, testing astroturf substrate, and light inhibiting methods. Steel drums are being prepared as fish rearing units along with aluminum troughs already in use.

A water table was built to maintain model egg incubators designed and operated by the technician students. Each of these incubators was stocked with several

hundred coho eggs and the students maintained records on embryo development, water temperatures, water flow, egg density and any other information and wrote a report on their observations.

As time, manpower, and funds become available, we will continue to add more demonstration incubators and fish rearing units as far as the limited space permits. The problem with filling the room with even necessary equipment is that it severly limits space for student projects which we have already seen is a better motivational technique of instruction for all our students, especially Natives. At some point in the very near future we shall have to find more indoor, out-of-the-weather student project space.

Classroom

A first floor room in the science building has been furnished to a limited extent primarily for fisheries courses but other disciplines use it when available. New lab-lecture tables were built and some storage space for books and equipment. Audio-visual equipment is on hand there and a bulletin board is maintained with clippings on fishery topics and job announcements. Work yet to be completed includes installing a sink, more shelves and cabinet space.

Pink Salmon Spawning

As indicated in an earlier section, we were fortunate this first year with regard to pink salmon. Contrary to expectations, 3-4000 pink salmon entered the science building hydroelectric plant tailrace from August 12 through September. The peak of the run hit around August 31. Five of our technician students were able to arrive by August 24 as we had requested and received a great deal of instruction

and experience in salmon spawning. The rest of the students didn't arrive until time for classes and had less opportunity as the run was nearly over. We want them to try again for an earlier arrival next year. Over 1000 Indian River females were spawned from August 19 to September 2. These plus about 100 from Katlian, taken for test comparisons, yielded about 1.8 million pink salmon eggs. Nearly as many males were handled to provide a 1:1 fertilization ratio to maintain as much genetic variability as possible.

A second important feature of the pink run, aside from its unexpected number and convenience to the hatchery was the fact that they were home stream fish rather than from a donor stream. This genetic input should give the best possible chance for maximum return in two years.

The fish were caught with a fyke trap placed between the cement walls of the flume exit. This was an effective trap but inefficient and very hard on the fish in terms of extra handling required to remove the salmon each day from that swift and very cold water, sort and transport them to quieter holding areas before they wore out from swimming against the current. Next fall we would like to locate the trap next to a holding pool excavated downstream from the flume to make the operation easier on both fish and people. Organizing an efficient trapping and holding facility will become crucial as our egg requirements increase and number of spawners handled becomes larger. We intend to ask ADF&G for an increase in pink salmon egg take next fall to build up our self-supporting fish stock base as rapidly as possible.

Chum Salmon Spawning

Because of the less than minimum escapement of chums into Katlian River, South Fork, the run was nearly over before we were given permission to capture any. By then our weir had washed out making the task extremely difficult. Beach seining on the bay shore near the mouth of the river and in the intertidal area of the river was unsuccessful for chums, though it yielded many pinks. We could find no large concentrations of chums in pools or over spawning gravel farther upstream. A box trap with long wings at the weir site caught about 30 females but heavy rains and rising water shortly forced an end to the operation. By the time the water receded, the last salmon had moved past us upstream. The chum females were spawned at Katlian and the eggs and sperm transported to the hatchery before they were combined for fertilization. These 75,000 eggs have also shown a greater than 95% development, indicating the transportation technique was good.

Coho Salmon Spawning

Under a separate collector's permit from ADF&G, we were allowed to remove seven female and three male cohos from Indian River in October. Six of the females ripened after several weeks of holding and were successfully spawned. Approximately 15,000 eggs were obtained. To date these eggs show about 99% survival in development past the eyed stage. Some of the eggs were used in the student model incubator project. After they hatch, the swim up fry will be fed and maintained by the students in their own individual rearing units. These fish must be maintained for a year until released as smolts in the spring of 1977. We hope to be able to rear more of these hatchery fed species for student training as our facilities permit. Pink and chum salmon

are released immediately after yolk sac absorption and provide limited opportunities for student feeding and maintenance practice.

Advisory Services

One objective of our program is to provide advisory services to interested Native groups and others on salmon farming. To this end, we can offer assistance in two areas: 1) consultant services on permit application and feasibility studies and 2) technician training. Of these two areas, our primary concern is technician training - providing skilled aquaculture personnel for the emerging public and private salmon ranching industry in Alaska. As for consultant services, our aim is to share our experiences with others and to direct inquiries to experts elsewhere in areas where our knowledge is lacking.

Information Dissemination

Documentation of our facility construction and permit application, available information on various aspects of aquaculture, and lists of agencies and personnel of specific expertise have been organized into information packets available to persons or groups seriously interested in starting hatcheries or needing help in particular related areas.

Cooperative Efforts and Contacts

In the last two quarters, cooperative efforts on Aquaculture development have begun or continued with the following groups:

1. The SJC Fisheries staff is serving as technical advisor to the Tlingit and Haida Central Council on their hatchery development program at

Sandy Bay, south of Sitka. Mr. Chet Mattson, NMFS fishery biologist is providing direct consulting services. The director presented a letter of support at the recent public hearing in Sitka for the Tlingit and Haida proposed hatchery at Sandy Bay.

2. The SJC staff continues to serve as technical and educational advisors to the Sand Point High School Aquaculture Program in the Aleutians.

3. Mr. Sam Fortier, Acting Executive Director, Bristol Bay Native Association, has joined our Technical Advisory Committee. We feel this will be mutually beneficial in that we will receive input from one of the most important fisheries regions in Alaska and perhaps provide a forum for idea exchange between Bristol Bay Natives and fisheries agencies. In July, we presented a public showing of "No More Fish", a film provided by Mr. Fortier, viewing the Bristol Bay sockeye salmon fishery situation from the Native point of view.

4. The SJC staff is serving as technical advisors to Alaska Salmon Farms, Inc., a private corporation proposing to build a hatchery south of Sitka.

5. Alaska Aquaculture Foundation, Inc., a private corporation, has proposed to build a salmon hatchery on Etolin Island south of Wrangell and has asked to develop ties with SJC's program for sponsoring and hiring our technician students and for cooperative support in research and project analysis of hatchery development.

6. The SJC Aquaculture staff has provided information on salmon culture techniques for the U. of A. Marine Advisory Program instructional workshops in the Cordova area. During December we shipped eyed pink salmon eggs to Cordova for one of the workshop classes.

7. Active cooperation has been maintained with the Prince William Sound Aquaculture Corporation (PWSAC). Their hatchery biologist, Terry Ellison, visited SJC to view our facilities and bring us up to date on their hatchery development. PWSAC has one of the three private hatchery permits issued in 1975. Two students from Eyak Village Corporation have enrolled in our technician program beginning this spring and next fall.

8. This program remains in close contact with the salmon enhancement plans of the Metlakatla community. Their designated future hatchery manager Mr. Steve Leask, is currently enrolled in our Aquaculture program.

Other contacts or requests for information have come from the following groups:

Native groups:

Alaska Native Brotherhood
SEALASKA Corporation - Juneau
Aleut Corporation - Anchorage
Tanana Chiefs Conference - Fairbanks
Squaxin Tribe - Washington

Educational Institutions:

University of Alaska Sea Grant Program - Marine Advisory Services
Humboldt State University - California

Legislators

U.S. Senator Ted Stevens
U.S. Senator Mike Gravel
State Senator Pete Meland
State Representative Dick Eliason
Mr. Guy Van Doren, Alaska Special Fisheries Committee

Commercial Firms:

Heath Tecna Corporation - Washington
Engineered Equipment Co - Anchorage

Others:

U.S. Dept. of Agriculture Research Service - Maryland
Matanuska Valley Fish and Game Advisory Committee
Indian and Northern Affairs Office, British Columbia
Individuals requesting information on starting private hatcheries.

ACKNOWLEDGEMENTS

The SJC Fisheries staff wishes to thank the Northwest Area Foundation without whose generous financial support this program would not have come into existance. We hope that as the next six months concludes their first two year grant, they will see sufficient merit in our efforts and intentions to continue that support for another two years towards our goal of becoming self sustaining.

Special thanks also go to the personnel of all the levels of government agencies involved in our program development and operation. Personnel of ADF&G USFS, and USPS especially, were very tolerant of another responsibility added to their already demanding and generally unappreciated workload while reviewing and approving our permit applications as speedily as regulations allowed in time for this fall's operation. We trust our conduct and willingness to comply with their wishes will justify their continued support.

A special group of people have given extra time and effort to provide us with guidance and encouragement through our Technical Advisory Committee. Its chairman, Dr. William McNeil, deserves much of the credit for this program and probably the promotion of Alaska salmon ranching in general through his generous expertise and contagious enthusiasm for its future. We look forward to a long and productive association with these mentors.

Many Native groups support this program financially and just as importantly through encouragement of their young people to investigate its possibilities as vocational training. Without their endorsement the educational function would lose its conceptual purpose.

The Sheldon Jackson College administrators and staff continue to bolster our efforts with facility, labor, and moral support. We look forward to the day when their innovative perception of the need for starting this process will be

justly rewarded.

As a newcomer to the Aquaculture Program, the director wishes in particular to thank the Fisheries staff - Dennis Lund, David Bright, and Cathy Hanson. Their devotion to duty and dedication to the task at hand exemplified by an incredible number of hours worked voluntarily without regard for personal compensation has certainly eased my burden of responsibility and more importantly laid the foundation for program success.

A special mention deserves to be made here of the former director, Derek Poon. Derek in his typically precise and knowledgable fashion planned and directed the program through its fledging year. He continues to provide us with expertise as a voluntary consultant for which we are gratified and fortunate.

To all our colleagues and friends, accept our inadequate thanks for your support and apologies for lack of time and space for personal mention. No one will try harder than the SJ Fisheries staff to earn your continued good wishes.

APPENDIX A FINANCIAL REPORT	FY 1975 Budgeted	FY 1975 Spent	FY 1975 Balance	FY 1976 Budgeted	7-1 to 11-30 1975 Spent	FY 1976 Balance	75-76 Total Balance
I. Salaries							
Foundation	29,942.06			38,749.00			
Matching	6,800.00			7,140.00			
Total	36,742.06	33,739.10	3,002.96	45,889.00	16,502.35	29,386.65	32,389.61
Fringe							
Foundation	3,901.59			6,587.00			
Matching	1,156.00			1,213.80			
Total	5,057.79	4,080.71	977.08	7,800.80	6,597.75	1,203.05	2,180.13
II. Equipment							
Foundation	39,729.15	18,497.58					
National Science	7,148.31	7,148.31					
Total	46,877.46	25,645.89	21,231.57	1,000.00	12,052.95	-11,052.95	10,178.62
III. Travel	2,000.00	1,817.33	182.67	5,675.00	0.00	5.675.00	5.857.67
IV. Other	5,000.00	2,542.31	2,457.69	5,000.00	1,400.72	3,599.28	6,056.97
Office Supplies							
Student Assistants							
Secretary							
Visting lecturers							
Teaching materials							
Long distance phone							
Misc.							
TOTAL Foundation	80,573.00			57,011.00			
Foundation + Matching	95,677.31	67,825.34	27,851.97	65,364.77	36,553.77	28,811.03	56,663.00
BALANCE 11/30/75							56,663.00*

33

* Balance available for operational expenses of seven remaining months of grant period and money previously encumbered to complete current projects.

34

Appendix C

TECHNICAL ADVISORY COMMITTEE

Revised Membership

Chairman: Dr. William J. McNeil, Chief
Anadromous Fishes Investigations
National Marine Fisheries Service
Auke Bay

Mr. Greg Argel
Development Planner
Metlakatla Island Reserve

Ms. Sheila Skannes
Vocational Counseling Aide
Bureau of Indian Affairs
Juneau

Mr. Pete Azure, Director
Native Studies Program
Sheldon Jackson College

Mr. Richard Eliason
State Representative
Sitka

Mr. Ed Halverson
Deputy Director
Office of Development Planning
Tlingit and Haida Central Council
Juneau

Mr. Dave Houseworth
Fisheries Consultant to
Metlakatla Island Reserve
Division of Fisheries Services
Ketchikan

Mr. Mark Jacobs, Jr.
Board of Directors
SEALASKA Corporation
Juneau

Mr. Chester Mattson
Supervisory Fisheries
Research Biologist
National Marine Fisheries Service
Auke Bay

Mr. Stan Moberly
S.E. Regional Supervisor
FRED Division
Alaska Dept. of Fish and Game
Juneau

Dr. Richard Nevé
Coordinator of Shore Programs
Professor of Marine Science
University of Alaska
Seward

Mr. Charles Olson
Alaska Native Brotherhood
Camp #1
Sitka

Mr. James Parker
Area Management Biologist
Alaska Dept. of Fish and Game
Sitka

Mr. Edwin Scholz
Assistant to the President
for Advancement
Sheldon Jackson College

Mr. Alan Otness
Administrative Assistant
Petersburg Fisheries, Inc.
Petersburg

Mr. Sam Fortier
Acting Executive Director
Bristol Bay Native Association
Dillingham

Mr. Derek Poon
Consultant to the Aquaculture Program
Former Program Director
Sitka

APPENDIX C

SHELDON JACKSON COLLEGE AQUACULTURE PROGRAM

Second Technical Advisory Committee Meeting

Chairman's Report

The Advisory Committee met for the second time at Sheldon Jackson College on November 19, 1975, to review progress of the aquaculture program and to make recommendations. Persons participating in the meeting included:

G. Argel, Metlakatla Indian Community
J. Barry, U.S. Forest Service
C. Bovee, Sheldon Jackson College
D. Bright, Sheldon Jackson College
E. Halverson, Tlingit-Haida Central Council
D. Houseworth, U.S. Fish & Wildlife Service
D. Lund, Sheldon Jackson College
C. Mattson, National Marine Fisheries Service
W. McNeil, National Marine Fisheries Service
M. Munn, Sheldon Jackson College
R. Neve', University of Alaska
A. Otness, Petersburg Fisheries Inc.
J. Parker, Alaska Department of Fish & Game
D. Poon, Consultant
E. Scholz, Sheldon Jackson College
M. Seifert, Sheldon Jackson College
B. Sele, Alaska Department of Fish & Game
S. Skannes, Bureau of Indian Affairs

Because of the excellent progress shown by the Sheldon Jackson College Aquaculture Program, very little time was spent on specific aspects of the planning schedule. It was the concensus of the Committee that program objectives were being achieved on schedule and that the time of the Committee could most profitably be devoted to questions which relate to future growth of the program.

There is every indication that salmon ranching is on the threshold of rapid development in both the private and public sectors within Alaska. Good returning runs of pink and coho salmon to experimental hatcheries in Alaska this past summer combined with other positive developments in the Pacific Northwest, Canada, and Japan have triggered considerable speculation about the economic viability of salmon ranching. Public and private funds are beginning to flow into salmon ocean ranching projects as a consequence.

The State of Alaska held its fourth public hearing on a proposed private hatchery on November 18, 1975, in Sitka. A permit is expected to be awarded for the proposed project which is planned by the Tlingit-Haida Indians at a location about 40 miles south of Sitka.

The proposed Tlingit-Haida project, along with other similar public and private projects, has already created a demand for skilled hatchery technicians. The Sheldon Jackson College aquaculture program is likely to experience pressures for expansion within the near future, but it was the belief of the Committee that enrollment should be kept at the present level of 15 students to avoid prematurely exerting too much pressure on the staff and limited facilities and to insure a quality educational experience for students. It was felt, however, that Sheldon Jackson College should begin soon to develop long-range plans for an expanded training program, including enlargement of facilities for training and for raising salmon. Planning for an expanded program should consider the long-term demands within Alaska for hatchery technicians and for preparation of students for professional degrees; desirability of providing internships and refresher courses; requirements for expanded production of salmon to finance the program; and requirements for additional classrooms and laboratories on the Sheldon Jackson College campus. An expanded program would continue to give priority to the needs of Native students but would also serve nonnative students.

In their new proposal to the Northwest Foundation, Sheldon Jackson College was encouraged to request support for upgrading teaching facilities and to activate the school year by mid-August in order to give students more exposure to handling adult salmon. It was also suggested that laboratory facilities be upgraded to permit marking of small groups of juvenile salmon for evaluation of hatchery techniques.

With approximately 1.8 million eyed pink salmon eggs presently on hand in the Sheldon Jackson College hatchery, there are prospects for a harvestable surplus of salmon returning to the Sheldon Jackson College hatchery as early as summer 1977. Several recommendations were made to Sheldon Jackson College to begin planning for harvest and sale of fish in 1977. The main thrust of these recommendations revolved around the time for harvest and the contractual arrangements which would facilitate harvest and maximize the benefits to be derived from these fish by Sheldon Jackson College. Specifically it was suggested that Sheldon Jackson College invite processors to bid on fish entering a special harvest area set aside for Sheldon Jackson College by Alaska Department of Fish & Game. ADF&G would establish a minimum number of fish for escapement to Indian River for natural spawning and Sheldon Jackson College would determine a minimum number required for hatchery brood stock. Surplus fish would be sold by Sheldon Jackson College to the highest bidder, who would in turn set a price on the fish to fishermen who participate in a controlled fishery. This approach is intended to (1) provide for the harvest of surplus fish while they maintain good quality, (2) relieve Sheldon Jackson College of the problem of harvesting and marketing fish; (3) insure maximum income to Sheldon Jackson College from their hatchery stock, (4) allow ADF&G maximum flexibility in achieving escapement goals and insuring an adequate number of brood fish for hatchery use, and (5) provide fishermen some income through their participation in the controlled, proprietary fishery. Amount of gear entering the controlled fishery would be limited, and participating fishermen would be selected by random lottery, if necessary.

Recent studies have shown that lakes produce good returning runs of adult coho when stocked with about 1,000 hatchery fry per acre. The adult coho are of excellent quality and bring a high price. Cost of such a program is modest, provided a pink and chum hatchery is available to produce the relatively small numbers of coho fry required. The Tlingit-Haida Indians would like Sheldon Jackson College to undertake a demonstration project on lake stocking with coho, and the Advisory Committee is in full agreement with this recommendation.

Another recommendation, supported by the Committee, was for Sheldon Jackson College to seek federal funding for a marine aquaculture project. Such a project would include work on invertebrates as well as salmon and would involve nutrient enrichment of embayments through artificial upwelling.

The Sheldon Jackson College staff asked the Committee to consider the possibility of inviting a student to belong to the Advisory Committee. The Committee was most agreeable to this suggestion, which was broadened to include a fisherman as well as a student.

Prepared by:
William J. McNeil
November 21, 1975